What is claimed:

1. A method of determining the position of a device relative to a landmark, comprising:

transmitting a pulse from the device, the pulse having a polarization;

receiving a return signal over a period of time, the return signal including a reflected pulse from the landmark, the receiving including preferentially receiving signals having the polarization; and

processing the return signal so as to isolate the reflected pulse from the return signal and to determine a range from the device to the landmark.

2. The method of claim 1, wherein the polarization is a circular polarization.

3. The method of claim 1, wherein the polarization is selected from the group consisting of right-hand circular polarization (RHCP) and left-hand circular polarization (LHCP).

4. The method of claim 1, including using a same circularly polarized antenna for both the transmitting and receiving.

5. The method of claim 1, including:

moving the device in a particular direction, at a velocity, while performing the receiving step;

detecting a Doppler shift in the reflected pulse portion of the return signal; and

determining an angle between the particular direction and a straight line between the device and the landmark as a function of the detected Doppler shift.

6. The method of claim 1, including:

transmitting the pulse at a first position of the device and determining from the received return signal a first set of range candidates, each range candidate representing a possible range to the landmark;

transmitting the pulse at a second position of the device and determining from the received return signal a second set of range candidates; and

processing the first and second sets of range candidates to produce a reduced set of range candidates that are consistent with one or more potential landmark positions.

7. The method of claim 1, including:

transmitting the pulse at a first position of the device and determining from the received return signal a first set of range candidates, each range candidate representing a possible range to the landmark;

transmitting the pulse at a plurality of additional positions of the device and determining from the received return signal a plurality of additional sets of range candidates; and

processing the first and additional sets of range candidates to produce a single range candidate corresponding to the landmark.

8. The method of claim 1, wherein:

the transmitting includes transmitting the pulse multiple times, each transmission of the pulse having a respective transmission beam pattern with a null over a different respective range of angles;

the processing including:

determining from the return signals from the multiple pulse transmissions a first set of range candidates, each range candidate representing a possible range to the landmark, each range candidate having an associated range of angles, and

analyzing the range of angles associated with each range candidate to produce a reduced set of range candidates that are consistent with one or more potential landmark positions.

9. The method of claim 8, wherein the null in the respective transmission beam pattern is less than 15° wide.

10. The method of claim 8, wherein the transmitting includes transmitting using at least two antennas driven by substantially identical signals having a phase difference, the phase difference controlling the range of angles of the null.

11. The method of claim 1, wherein:

the transmitting includes transmitting a series of pulses;

the receiving includes (A) receiving the series of pulses at a plurality of distinct locations having a predefined separation distance therebetween and generating a series of received pulse data sets corresponding to at least a subset of the received pulses, each received pulse data set having received pulse data from receiving a respective pulse at each two or more of the plurality of distinct locations, and (B) combining the pulse data within each pulse data set to produce a combined return signal having a receive pattern null in an associated range of angles;

the processing including:

determining from the combined return signals a first set of range candidates, each range candidate representing a possible range to the landmark, and determining for each range candidate angle-related signal strength data comprising a plurality of amplitude values associated with a respective plurality of angle ranges; and

analyzing the angle-related signal strength data associated with at least one of the range candidates to produce a reduced set of range candidates that are consistent with one or more potential landmark positions.

12. The method of claim 1, wherein:

the receiving includes

receiving the pulse at a plurality of distinct locations having a predefined separation distance therebetween and generating received pulse data for at least two of the plurality of distinct locations at which the pulse is received;

combining the received pulse data multiple times, using a plurality of phase offsets, to produce multiple combined return signals, each having a receive pattern null in an associated range of angles;

the processing includes

determining from the combined return signals a first set of range candidates, each range candidate representing a possible range to the landmark, and determining for each range candidate angle-related signal strength data comprising a plurality of amplitude values associated with a respective plurality of angle ranges; and

analyzing the angle-related signal strength data associated with at least one of the range candidates to produce a reduced set of range candidates that are consistent with one or more potential landmark positions.

13. The method of claim 1, including repeating the transmitting and receiving a plurality of times and combining the resulting return signals to produce a representative return signal, wherein the processing step processes the representative return signal.

14. The method of claim 1, including repeating the transmitting and receiving a plurality of times while the device remains at substantially a single location, and combining the resulting return signals to produce a representative return signal, wherein the processing step processes the representative return signal.

15. A positioning system, comprising

a passive, isotropic reflecting landmark at a fixed position; and

a device configured to transmit an electromagnetic pulse, the pulse having a polarization; the device further configured to receive a return signal over a period of time, the return signal including a reflected pulse from the reflector, and to process the return signal so as to isolate the reflected pulse from the return signal and to determine a range from the device to the reflector;

the reflecting landmark comprising:

a first passive reflector for reflecting electromagnetic pulses;

a second passive reflector for reflecting electromagnetic pulses; and

a static structure configured to statically position the second passive reflector at an angle relative to the first passive reflector, wherein the angle is about 90°.

16. The system of claim 15, wherein the polarization is a circular polarization.

17. The system of claim 15, wherein the polarization is selected from the group consisting of right-hand circular polarization (RHCP) and left-hand circular polarization (LHCP).

18. The system of claim 15, wherein the device includes at least one antenna configured to preferentially receive signals having the polarization.

19. The system of claim 15, wherein the device includes at least one antenna configured to both preferentially transmit the pulse having the polarization and to preferentially receive signals having the polarization.

20. The system of claim 15,

the device including

a vehicle locomotion mechanism for moving the device in a particular direction, at a velocity;

a data processor;

at least one program module, executed by the data processor, the at least one program module containing instructions for:

detecting a Doppler shift in the reflected pulse portion of the return signal; and

determining an angle between the particular direction and a straight line between the device and the landmark.

21. The system of claim 15,

the device including:

a vehicle locomotion mechanism for moving the device in a particular direction, at a velocity;

a data processor;

at least one program module, executed by the data processor, the at least one program module containing instructions for:

transmitting the pulse at a first position of the device and determining from the received return signal a first set of range candidates, each range candidate representing a possible range to the landmark;

transmitting the pulse at a second position of the device and determining from the received return signal a second set of range candidates;

processing the first and second sets of range candidates to produce a reduced set of range candidates that are consistent with one or more potential landmark positions.

22. The system of claim 15,

the device including

a vehicle locomotion mechanism for moving the device in a particular direction, at a velocity;

a data processor;

at least one program module, executed by the data processor, the at least one program module containing instructions for:

transmitting the pulse at a first position of the device and determining from the received return signal a first set of range candidates, each range candidate representing a possible range to the landmark;

transmitting the pulse at a plurality of additional positions of the device and determining from the received return signal a plurality of additional sets of range candidates;

processing the first and additional sets of range candidates to produce a single range candidate corresponding to the landmark.

23. The system of claim 15,

the device including

a data processor;

at least one program module, executed by the data processor, the at least one program module containing instructions for:

transmitting the pulse multiple times, each transmission of the pulse having a respective transmission beam pattern with a null over a different respective range of angles;

determining from the return signals from the multiple pulse transmissions a first set of range candidates, each range candidate representing a possible range to the landmark, each range candidate having an associated range of angles; and

analyzing the range of angles associated with each range candidate to produce a reduced set of range candidates that are consistent with one or more potential landmark positions.

24. The system of claim 23, wherein the null in the respective transmission beam pattern is less than 15° wide.

25. The system of claim 23, wherein the device includes at least two antennas driven by substantially identical signals having a phase difference, the phase difference controlling the range of angles of the null.

26. The system of claim 15,

the device including:

an antenna configured to receive electromagnetic pulses at a plurality of distinct locations having a predefined separation distance therebetween;

a data processor;

at least one program module, executed by the data processor, the at least one program module containing instructions for:

transmitting a series of pulses;

generating from the return signals from the multiple pulse transmissions a series of received pulse data sets corresponding to at least a subset of the received pulses, each received pulse data set having received pulse data from receiving a respective pulse at each two or more of the plurality of distinct locations;

combining the pulse data within each pulse data set to produce a combined return signal having a receive pattern null in an associated range of angles;

determining from the combined return signals a first set of range candidates, each range candidate representing a possible range to the landmark, and determining for each range candidate angle-related signal strength data comprising a plurality of amplitude values associated with a respective plurality of angle ranges; and

analyzing the angle-related signal strength data associated with at least one of the range candidates to produce a reduced set of range candidates that are consistent with one or more potential landmark positions.

27. The system of claim 15,

the device including:

an antenna configured to receive electromagnetic pulses at a plurality of distinct locations having a predefined separation distance therebetween;

a data processor;

at least one program module, executed by the data processor, the at least one program module containing instructions for:

transmitting a series of pulses;

generating from the return signals from the multiple pulse transmissions a series of received pulse data sets corresponding to at least a subset of the received pulses, each received pulse data set having received pulse data from receiving a respective pulse at two or more of the plurality of distinct locations;

combining the received pulse data multiple times, using a plurality of phase offsets, to produce multiple combined return signals, each having a receive pattern null in an associated range of angles;

determining from the combined return signals a first set of range candidates, each range candidate representing a possible range to the landmark, and determining for each range candidate angle-related signal strength data comprising a plurality of amplitude values associated with a respective plurality of angle ranges; and

analyzing the angle-related signal strength data associated with at least one of the range candidates to produce a reduced set of range candidates that are consistent with one or more potential landmark positions.

28. The system of claim 15,

the device including

a data processor;

at least one program module, executed by the data processor, the at least one program module containing instructions for:

repeating the transmitting and receiving a plurality of times;

combining the resulting return signals to produce a representative return signal; and

processing the representative return signal to produce a set of range candidates that are consistent with one or more potential landmark positions.